NanoPhotometer™ Pearl
Software Installation and User Manual

Version 1.2

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IMPORTANT:
There is no CD delivered with the NanoPhotometer™ Pearl PVC Software package. The installation file is available on our homepage in the download area. The access code for the PVC software you can find on the top of the PVC Installation and User Manual.

1. SUMMARY OF FEATURES

The NanoPhotometer™ Pearl PVC (Print via Computer) software is an application running under Windows™ 2000, Windows™ XP (32 bit) and Windows™ 7 (32 or 64 bit) that enables one or more spectrophotometers to transfer data into a PC environment. From there the user has a selection of choices; the data can be both printed and saved (in a variety of formats).

The NanoPhotometer™ Pearl software is capable of connecting with several instruments simultaneously, limited only by hardware and the speed of the host system.

The NanoPhotometer™ Pearl software can operate via USB, Bluetooth or USB/Bluetooth simultaneously.

The NanoPhotometer™ Pearl software can store data either to a common directory or be configured to save to independent directories according to file format and/or instrument.

The NanoPhotometer™ Pearl software can save data in graphics format, text format or as an Excel™ format file (note Excel must be installed on the PC to allow this format).

The NanoPhotometer™ Pearl software can print to any printer connected to the PC including network printers.

The NanoPhotometer™ Pearl software can be configured to automatically save & print data.

2. INSTALLATION

PLEASE DO NOT CONNECT AN INSTRUMENT TO THE PC UNTIL THE NANOPHOTOMETER™ PEARL SOFTWARE AND FTDI DRIVERS ARE INSTALLED.

2.1 Requirements

Before starting the installation process ensure the following requirements are met.

PC must be running Windows™ 2000, Windows™ XP (32 bit) or Windows™ 7 (32 or 64 bit).
If the instrument is connected by Bluetooth the instrument must be fitted with a Bluetooth module and the PC must support Bluetooth (either on-board or via a USB Bluetooth adaptor).
If the instrument is to be connected by USB the PC must be fitted with a universal serial bus controller and USB connectors.
If it is intended to directly export to Microsoft Excel™ then please note that we currently support Excel 2003 and 2007.
The NanoPhotometer™ Pearl software application requires Microsoft .NET Framework 2.0 environment. The NanoPhotometer™ Pearl software installation may require the installation of the .NET framework on your PC. This can only be done by an installer with administrator privileges. The installation process will automatically check your computer for the availability of the environment. For automatic installation your computer has to have an Internet connection. If no Internet connection is available please install Microsoft .NET Framework 2.0 manually by launching dotnetfx.exe. The file can be downloaded from the Implen webpage.
To connect to instruments via USB, PVC uses USB to serial port drivers. These drivers must be loaded into the Windows™ system directory. This process requires an installer with administrator privileges.
To install the NanoPhotometer™ Pearl software the installer should be logged into Windows™ with full administration rights. If you have insufficient privileges, installation may fail. To check whether you have sufficient rights check the following screen. If in doubt consult your PC administrator.

Various operating systems and PC hardware may cause the set-up procedure to differ from that described here. This process is given as guidance only; it may need adaptation for other Bluetooth systems.

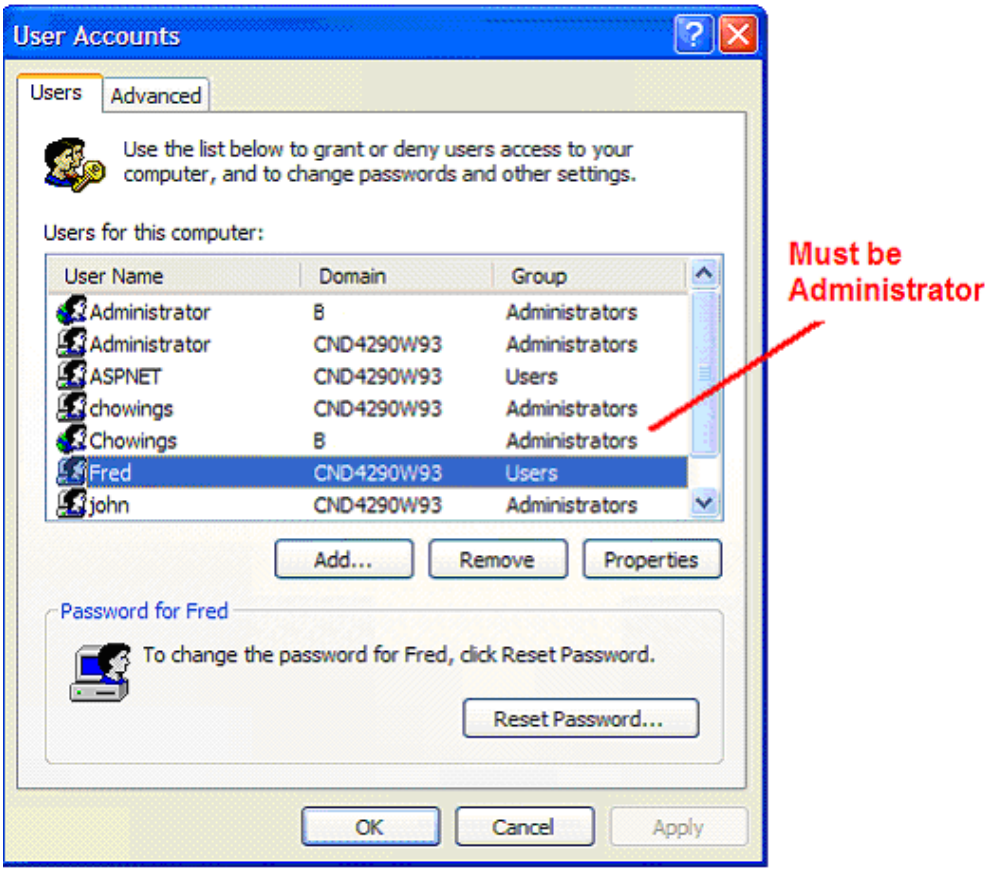
To prevent loss of data it is important to ensure that the instrument is connected before any tests are undertaken. Also make sure that connections are stable and not lost during measurements and data transmissions.

Always ensure that the system has enough time to save transferred sample data especially when working with Bluetooth accessory. The speed on Bluetooth transmission depends on signal strength of the Bluetooth connection.

Documents are not closed until the user exits the application or switches the instrument off. This is because PVC tabulates the data under headings and does not display any results until all measurements have been made to conserve paper.

ALWAYS UNPLUG PC CONNECTION BEFORE CONNECTING OR DISCONNECTIONG ANY ACCESSORY.

Start >Control Panel > User Accounts.



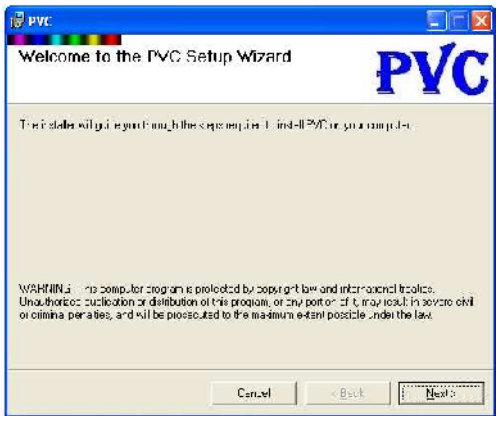
2.2 NanoPhotometer™ Pearl software installation

The installation file for the PVC Software for the NanoPhotometer™ Pearl can be downloaded from the download area of our homepage (www.implen.com). The NanoPhotometer™ Pearl software should be installed onto the PC on which you intend to connect instruments and run the software. The installation process carries out the following:

Installs Microsoft .NET Framework and Windows installer (unless already installed on the PC)
Installs the NanoPhotometer™ Pearl PVC software
Installs USB drivers for the instrument

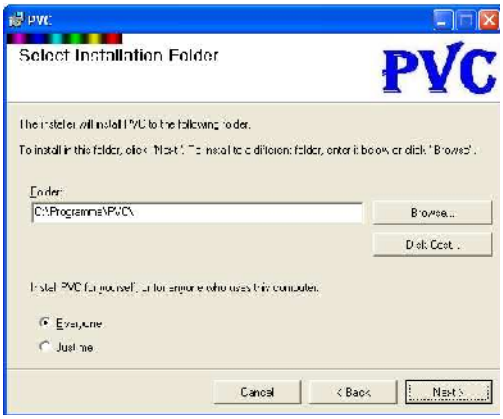
2.2.1 Procedure

1. Please change in your NanoPhotometer™ Pearl the printer setting to “Computer USB”: press 5: Utilities; 3: Printer; Auto-Print ON; Printer: Computer (USB)
2. Please download the NanoPhotometer™ Pearl software from the Implen webpage (http://www.implen.de/nanophotometer/downloads.php).
3. For installation please click on the SETUP.EXE file.
4. Initial checks determine whether the Microsoft .NET framework and Microsoft installer software is already installed on your PC. If it is not, a copy of this software will be installed from the installation disk. If this occurs then you must accept the Licence agreement to continue and please note that a re-start of the computer will be required. Please be patient, the process could take some time. The installation will continue once re-start has been performed.

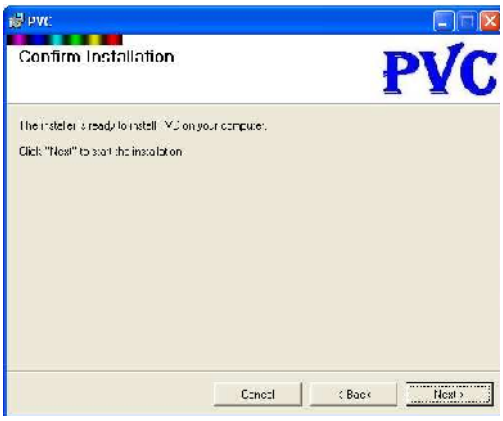


5. Once satisfied that all pre-checks have passed the installer presents the PVC installation welcome screen.

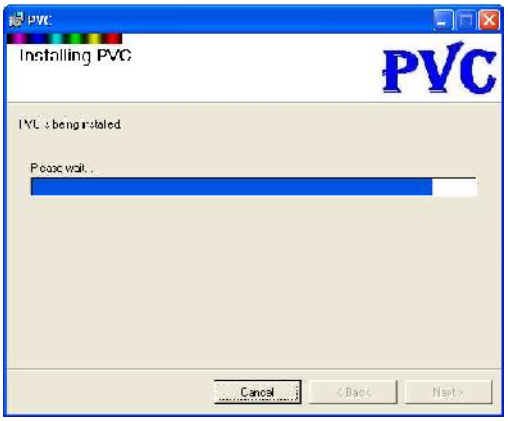
6. The next screen displays a license agreement for the software. Please read and accept by selecting on “I Agree” and then clicking on “Next”.



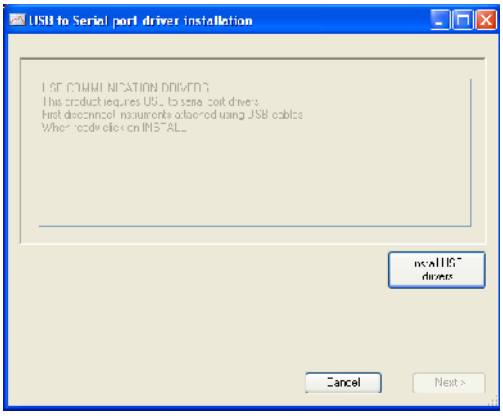
7. This screen allows the installer to choose a destination directory for the installation files. It also provides the installer with the option to install the software for just the installer or for everyone using the PC. It is recommended that the software be installed for everyone so that the desktop icons and start program PVC menu items are visible to all.



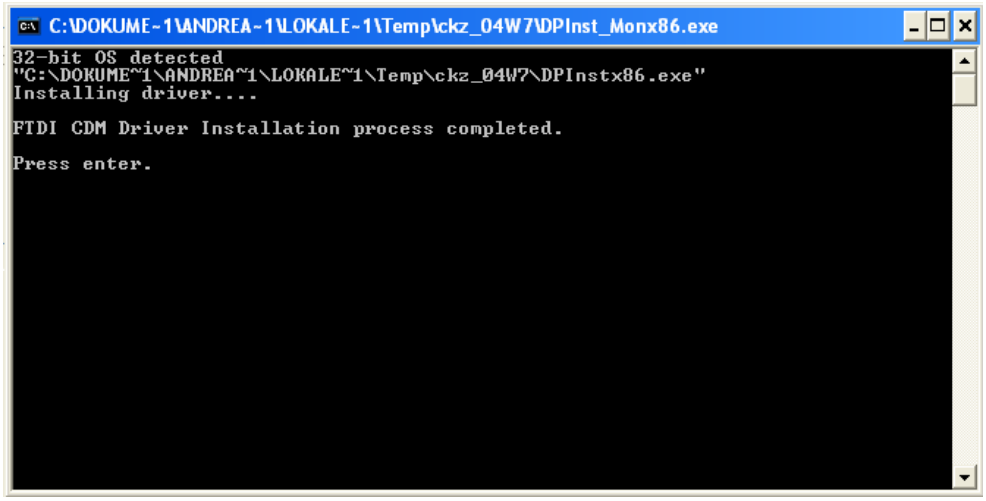
8. The installer now has all the information it needs to proceed with the installation. Click on “Next” to continue.

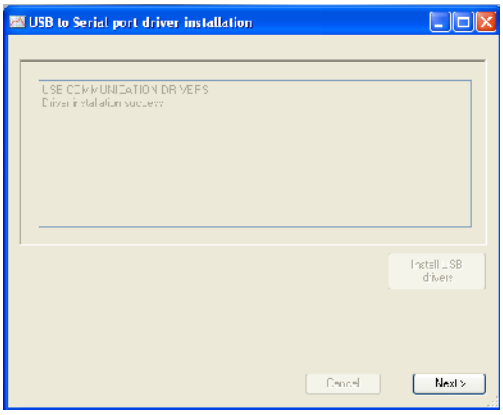


9. Progress bar shown during installation.

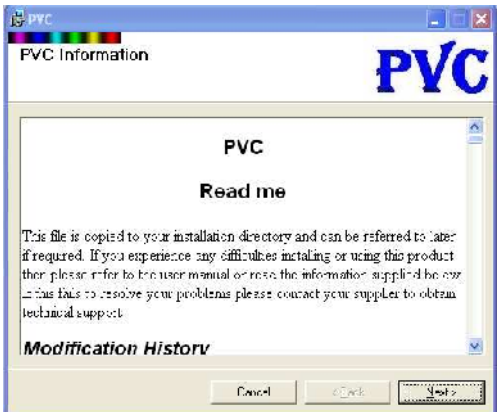


10. The USB driver installation prompt screen. USB drivers are required if units are connected using USB cables. To initiate the installation of the FTDI USB drivers click on the “Install USB drivers” button. Once driver installation is complete, clear the USB driver installed confirmation screen by using the enter key. When first connecting an instrument using a USB connection you may be prompted to provide further information, see invoking the USB serial converter and USB serial port enumerator

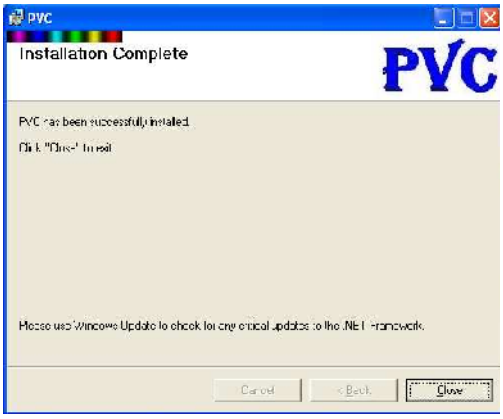




11. Finally return from installation prompt screen by clicking on Next. This will return to an installation progress screen.



12. PVC read me notes will then be displayed. The text file contains summary information on how to install and connect instruments to the software. It also provides answers to frequently asked questions. Please read the text and click “Next”.



13. Installation complete screen.

2.2.2 Invoking the USB serial converter and USB Serial port enumerator

Once the drivers have been successfully installed on the PC, the next step in the USB connection installation process is to create the port the instrument will use when it is plugged into the PC.

The virtual communications port consists of two components:

1. USB to serial converter
2. USB serial port enumeration

On some systems this part of the USB installation process will happen automatically when an instrument is connected to a USB port. If this does not occur the installation will proceed using the operating systems *found new hardware wizard* as described below.

USB to Serial Converter

1. Connect an instrument to the USB port of the computer and switch it on. The computer will detect that new hardware has been found.

2. A wizard will then be displayed that will install software for "*USB <-> serial*". On the screen select "*install the software automatically*" and click next.

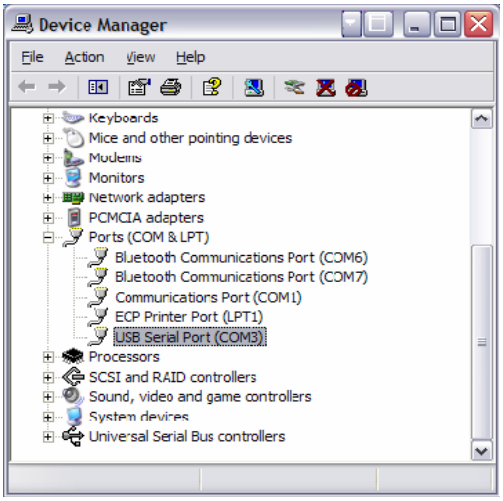
3. Once the wizard has completed click the finish button.

USB Serial Port Enumeration

Found New Hardware Wizard
Welcome to the Found New Hardware Wizard
If your hardware came with an installation CD or floppy disk, insert it now.
What do you want the wizard to do?
Click Next to continue.
< Back
Next >
Cancel

4. Another wizard will then start that will install software for "*USB Serial Port*". Again select "Install this software automatically" and click next.

5. Once the wizard has completed click the finish button.



6. The USB serial port should now appear under ports in the Windows device manager.

7. Further instruments may now be connected. This will probably cause a notification window to appear indicating that the connection has been detected but should not invoke any installation process. Note that the port list should refresh after a short period to show the new ports added.

2.2.3 USB instrument connections

Connecting and disconnecting

You can remove the USB cable from either the instrument or the PC when it is switched on without damaging the hardware but it is recommended that any software using the link is de-activated or shut-down first. Failure to do so can sometimes lead to a COM port being locked out from an application where it has not been properly closed down by another. PVC incorporates a STOP command for this purpose.

Next time the instrument is connected using the USB cable a message window may appear but the USB drivers should not require re-installation.

If the PC has a speaker then an audible notification may be heard when the USB cable is inserted or removed from the PC.

When more instruments are connected to the PC using USB connections it will not be necessary to go through the 'Add New Hardware' wizard again but message window and audible notifications may appear to indicate that the connection has been detected.

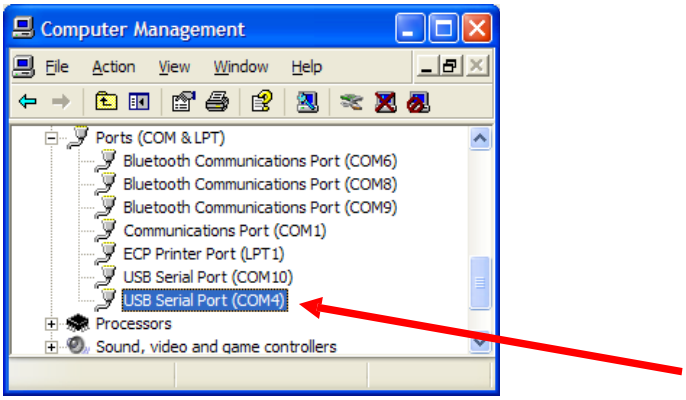
The COM port used by an instrument will change if the USB cable is inserted in a different USB socket. If required use the Windows device manager to determine which COM port is used when the USB cable is inserted, see below.

Serial port allocation

The USB driver serial port enumerator will allocate the next free COM port to the USB connection used. Once allocated this USB connection will always be associated with the same serial port. If you use a different USB connection this will be associated with a different Serial port. The installation of a USB hub would normally reserve a range of COM ports but inserting the hub into another USB connection can cause a new range of com ports to be reserved. This can lead to unexpected allocation of serial ports.

To view allocated serial ports access the Windows Device Manager as follows:-

1. Select the Windows control panel and double click on the system item.
2. Access the hardware tab and click on the device manger,



Notes

Some allocated COM ports may not appear in this list if they are currently not active or connected. For instance a USB connection will only be shown if an instrument is currently connected!

To determine which COM port each instrument is assigned to, watch the device manager update as you insert each USB cable.

The USB port of an instrument will be active if the power is connected, even if the instrument is turned off.

2.3 Bluetooth instrument connections

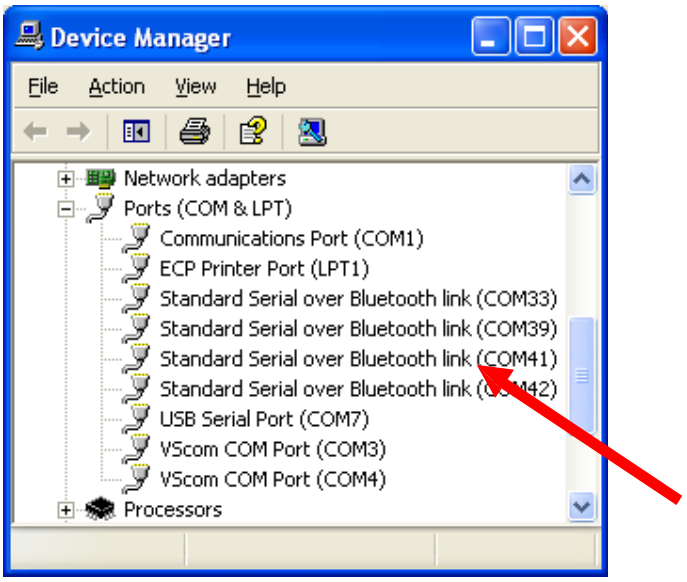
2.3.1 Introduction

The Bluetooth cannot be installed with the instrument thermal printer option simultaneously.
Once installed, data can be sent to a PC either by Bluetooth or USB but these options cannot be used simultaneously.
The host PC will also need a Bluetooth 'radio' device. A USB to Bluetooth adapter is available separately. Make sure the Bluetooth hardware has been installed on the PC in accordance with the manufacturer's instructions.
Please change the printer setting of your NanoPhotometer™ Pearl to "Bluetooth":
press 5: Utilities; 3. Printer; Auto-Print ON; Printer: Bluetooth

The Bluetooth connection module will be pre-installed to the NanoPhotometer™ Pearl by Implen. If the Bluetooth device was ordered separately please follow the instruction provided with the package.

For each instrument that is to be connected using Bluetooth it is necessary to add the instrument to the list of known Bluetooth devices on the PC. For security reasons Bluetooth devices use a pass key pairing system when establishing a connection. The connection process can be simplified by setting up the pairing information on the PC as part of the device information and arranging for devices to automatically pair and connect when discovered. Spectrophotometer instruments used with PVC use the instrument serial number as the pass key or PIN. You will be required to provide this information during the configuration of the Bluetooth device. Do not be tempted to bypass the pairing definition as this only complicates the process of opening a port associated with an instrument.

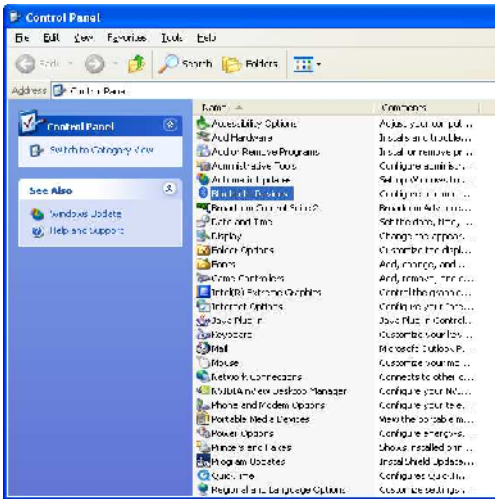
Once an instrument is successfully installed as a Bluetooth device it will be associated with a serial port that will be visible in the Windows device manager.



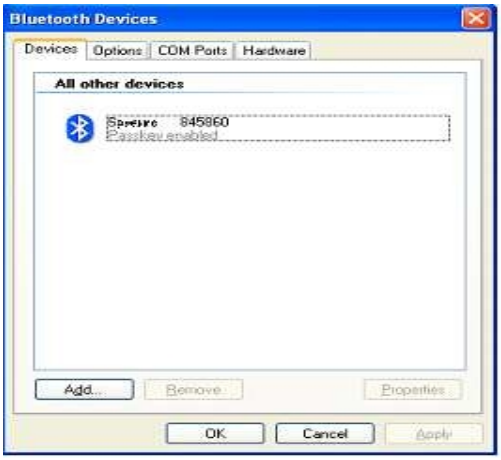
The Bluetooth hardware fitted to your PC may have come with its own software interface for creating Bluetooth device serial service connections. The following examples are typical of a Bluetooth device set up, but the exact format of the set up wizard or access to it may be different on your computer.

Various Bluetooth adaptors will provide associated software, often specific to that vendor. It has been our experience that not all of these work successfully with all Bluetooth devices providing serial port services such as the spectrophotometer Bluetooth accessory we provide. Best results have been found by using the generic Microsoft™ drivers, which Windows includes. If the device is not compatible with these drivers it may not work well with this accessory. Please note that we cannot support third party software.

2.3.2 Adding a Bluetooth device using the control panel Bluetooth devices



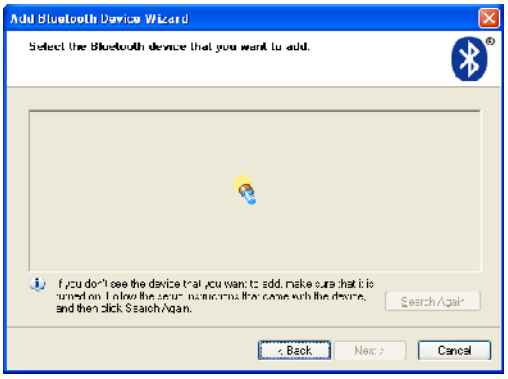
1. From the Windows control panel double click on Bluetooth devices



2. This will show the currently defined and allowed list of Bluetooth devices known to the PC. To add a new Bluetooth connection to an instrument, start the wizard by clicking on Add...

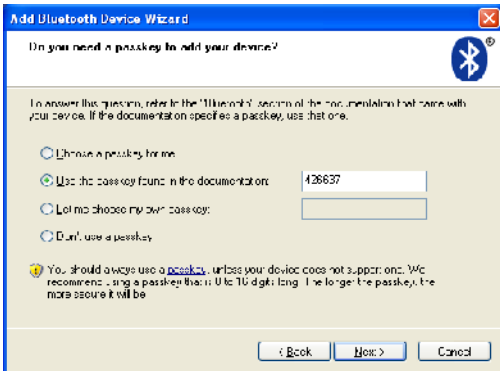
Add Bluetooth Device Wizard
Welcome to the Add Bluetooth Device Wizard
Before proceeding, refer to the "Bluetooth" section of the device documentation. Then set up your device so that your computer can find it.
Turn it on
Make it discoverable (visible)
Give it a name (optional)
Press the button on the bottom of the device (keyboards and mice only)
My device is set up and ready to be found.
Add only Bluetooth devices that you trust
< Back
Next >
Cancel

3. The opening page of the add device wizard. Ensure that the instrument is fitted with the Bluetooth module and the instrument is powered and switched on. *Please note* that the instrument Bluetooth module needs to be configured after installation. This configuration is automatic but requires that the instrument is power cycled after installation. Check mark the check box and click on “Next”.



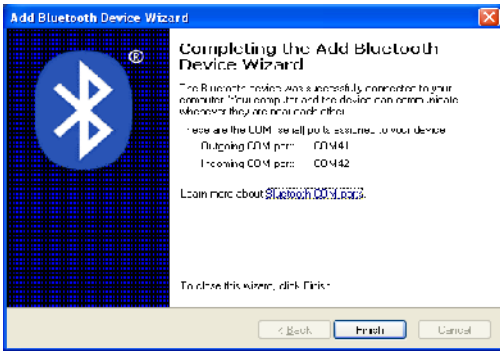
4. The wizard searches for all discoverable devices.

5. Once the search has completed, all discovered devices are shown in a list. New devices are identified as such. Spectrophotometer instruments provide the model name followed by the last 6 characters of the Bluetooth module number. If the spectrophotometer was not found, check the module fit and retry by clicking on “Search Again”. Once found select the new device and click on “Next”.


Add Bluetooth Device Wizard
Do you need a passkey to add your device?
Use the passkey found in the documentation
428637
< Back
Next >
Cancel

6. The next screen allows us to set up the security pairing for the instrument connection. Choose ‘Use the passkey found in the documentation‘ and type in the instrument serial number (you can view this on the instrument utilities, about dialogue box. Alternatively it should be on a label attached to the back or bottom of the instrument).

7. The wizard will then attempt to connect and discover the services provided by the Bluetooth device. The instrument provides a serial port ‘SPECTRO’ service and the wizard will automatically allocate a pair of COM ports to this device.



8. This screen illustrates a typical ‘add new device wizard completion’ screen, for a spectrophotometer instrument. It shows the serial ports allocated for the Bluetooth connection. Click on “Finish” to return to the Bluetooth devices dialogue.

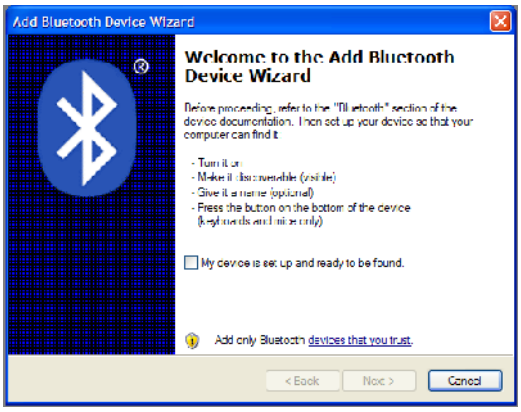
9. The list of known devices now includes the new instrument. Add further instruments to the list of Bluetooth devices in the same way.

10. Note that the serial port associated with the instrument can be viewed on the COM Ports tab. The ports used by PVC for communication with the instrument will be marked with 'SPECTRO'. You can also use the Windows control panel, device manager, port list, to determine port usage. (Note the other port allocated to this service is not actually used in this scenario).

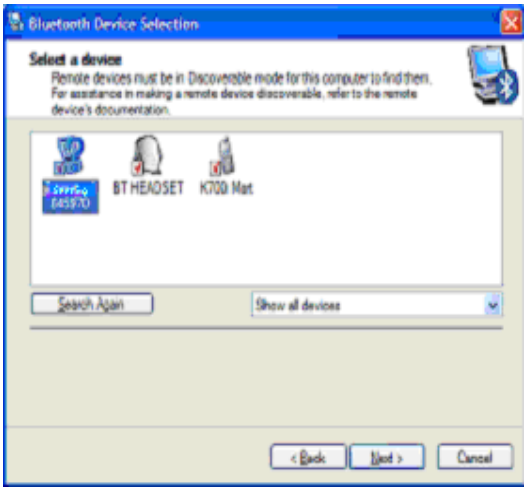
2.3.3 Adding a Bluetooth device using My Bluetooth places

This example of installing a Bluetooth device uses the my Bluetooth places sometimes visible in 'My Computer'

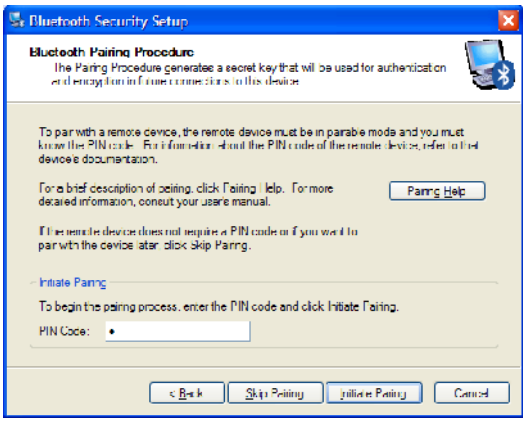
1. Go to My Bluetooth places under my computer and start the Bluethooth setup wizard.


Add Bluetooth Device Wizard
Welcome to the Add Bluetooth Device Wizard
My device is set up and ready to be found.
Add only Bluetooth devices that you trust.
< Back
Next >
Cancel

2. Make sure the instrument is powered up. Tick the box to indicate that it is discoverable and click "Next".

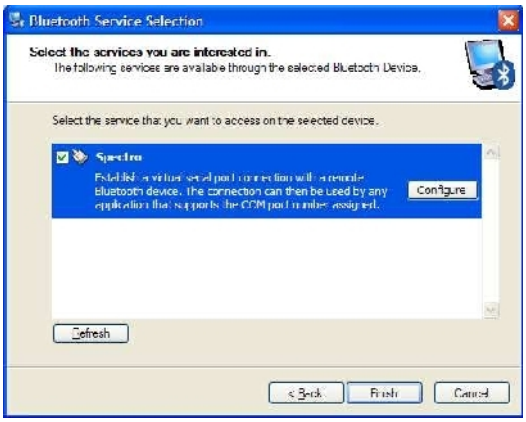

Bluetooth Device Selection
Select a device
Remote devices must be in Discoverable mode for this computer to find them.
For assistance in making a remote device discoverable, refer to the remote device's documentation.
BT HEADSET
K700 Mat
Search Again
Show all devices
< Back
Next >
Cancel

3. The instrument should appear in the list showing the model name and the last 6 characters of the Bluethooth adapter code. Select the “SPECTRO” device and click “Next”.


Bluetooth Security Setup
Bluetooth Pairing Procedure
The Pairing Procedure generates a secret key that will be used for authentication and encryption in future connections to this device.
To pair with a remote device, the remote device must be in pairable mode and you must know the PIN code. For information about the PIN code of the remote device, refer to the device's documentation.
For a brief description of pairing, click Pairing Help. For more detailed information, consult your user's manual.
Pairing Help
If the remote device does not require a PIN code or if you want to pair with the device later, click Skip Pairing.
Initiate Pairing
To begin the pairing process, enter the PIN code and click Initiate Pairing.
PIN Code:
< Back
Skip Pairing
Initiate Pairing
Cancel

4. At the next screen you will be prompted to initiate pairing between the PC and the device. If you intend to use the instrument with only 1 PC it is recommended that you pair the two devices. The PIN code will be the serial number of the instrument (shown on the label on the back or bottom of the instrument).

Note:
The Bluetooth device requires pairing to operate. If the skip pairing button is pressed the PC forces you to enter the PIN code in a different window!



5. Check the service you want to use, “Spectro”. Another window should appear. If not, press “Configure”.

6. Select the COM port you want to use (You can add more Bluetooth COM ports if required, see later) and click “OK”.

7. When you click “OK” on this window you should go back to the previous window. Click “Finish”. Your PC may now be busy for a few minutes as it re-configures itself.

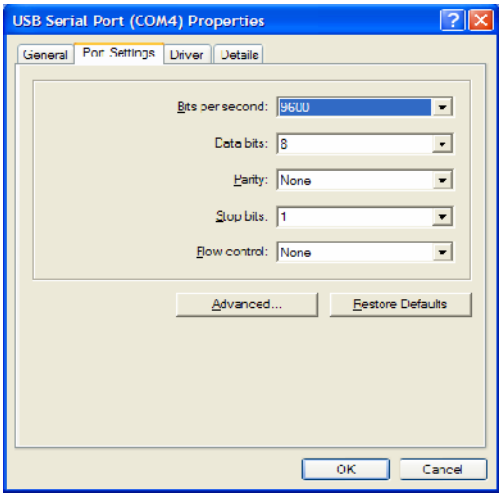
8. Go back to my Bluetooth places. You should now see an icon for each spectrophotometer which has been setup. Double-clicking on one of these icons will open the connection (Here, the lower icon shows that the instrument is connected to COM8)

Note:

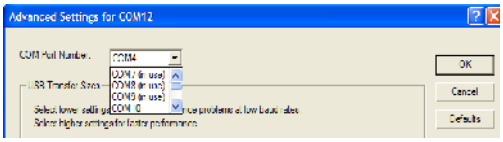
Make sure the program you are using is also configured to use the same COM port (e.g. PVC).
Some programs may be capable of opening to COM port automatically, making the last step above unnecessary.

2.3.4 Com port conflicts

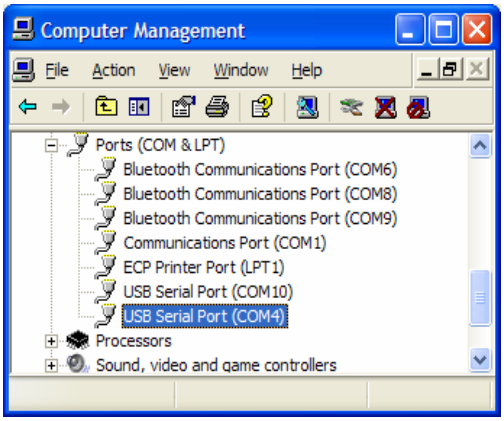
USB and Bluetooth driver software create serial port enumerations. Normally a driver will allocate the next available and unused port but occasionally port allocation conflict can occur. This would normally only happen if a user has by mistake allocated a port to a port already in use. If this problem occurs you can re-assign the port allocation as follows.



1. From the windows device manager (see above), double click on the port you want to re-assign. This displays the properties window for the port. Access the Port Settings tab and then click on the 'Advanced' button.



2. Using the drop down port name list, select the first port that *is not in use* (COM10 in the example shown). Click OK to make the change and return to the properties window. Click on OK to return to the device manager port list.



3. You may have to close and re-open the device manager to show the result of your change.

2.4 Run time operator privileges

The run time operator should have privileges to read and modify the PVC key and its sub keys stored within the HKEY_LOCAL_MACHINE SOFTWARE PC registry. Note that an administrator or standard user should have these privileges by default but a restricted user probably will not.

PVC uses the PVC key to hold application settings and instrument information. The PVC key and sub keys are created for the first time when the software is run. A new sub key is created for each new instrument found attached. When options for an existing instrument are changed then sub keys associated with the instrument key are modified to reflect the changes. Without modify rights it is likely that the user will encounter registry access denied errors.

PVC was not designed to be run remotely from a networked computer. Using PVC in this way would require the operator to read and modify registry values on the remote computer where the software was installed. In this scenario it is unlikely that anyone other than an administrator with full registry modification rights in the local domain would be able to read let alone modify the registry settings. Please ensure that PVC is installed on the computer on which the operator will work.

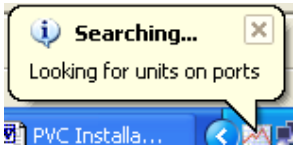
3. PRINT VIA COMPUTER

3.1 Starting up the NanoPhotometer™ Pearl software

Any of the following methods can be used to start PVC

Double click the PVC desktop icon.
Select the PVC item in the start, all programs, PVC menu
Using windows explorer, explore the program files/PVC folder and double click on PVC.EXE

A small icon will appear in the tray area of the Windows™ tool bar.



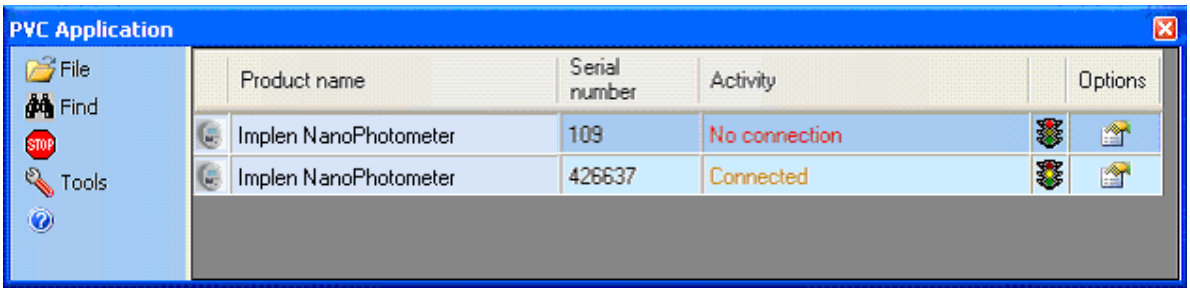
Various popup messages will indicate the progression of the start up process. The start up process recovers application settings and searches for attached instruments on Bluetooth and USB serial ports. Once start up is complete the main display will be shown.

3.2 Printer settings NanoPhotometer™ Pearl

Please change the printer settings in your NanoPhotometer™ Pearl to the connection you would like to use:
Press 5: Utilities; 3: Printer; set Auto-Print to ON and Printer to Computer (USB), Bluetooth or SD Memory Card

3.3 Main display

The main display lists all instruments known by the application, irrespective of whether a connection is currently active. As new instruments are attached, so the list of known instruments will grow. Instruments are identified by product name and serial number. The traffic indicator, activity text and font colour are used to describe instrument status and provide visual clues as to current activity; red is not connected, golden yellow is connected but waiting for data, whilst green is used when data is being received, printed, saved or exported.



From the main display you can:

Observe instrument activity of connected instruments.
Start a new search for connected instruments (click find).

Stop PVC running and disconnect from all instruments (click stop). Windows™ does not always handle disconnection of USB serial ports well, so if a unit is disconnected and then re-connected the data link can be lost without PVC being aware of the problem. This could lead to loss of data so it is recommended that stop be used before attempting re-cabling of USB leads.

Use the option button to set up display, save, print and export options for an instrument in the list.
Remove an instrument in the list (that is no longer used on this PC. Select the instrument and use the delete key. *You can not remove an instrument that is currently connected*.

Set up the default printer for the application (accessible from the file menu item).

Define a port exclusion list to speed up the instrument search (accessible from the tools menu).

Synchronise instrument date and time to the PC date and time (accessible from the tools menu).

Hide the main display (accessible from the file menu. Alternatively click on in the caption bar).

Exit the application (accessible from the file menu).

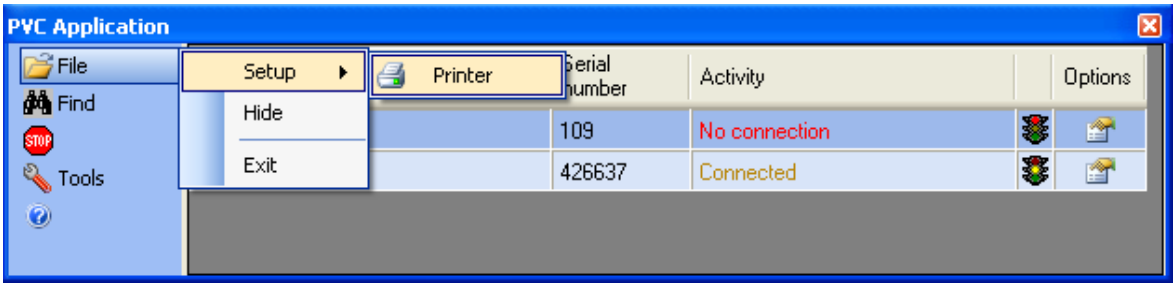
Display version information (by clicking).

3.4 Notify icon

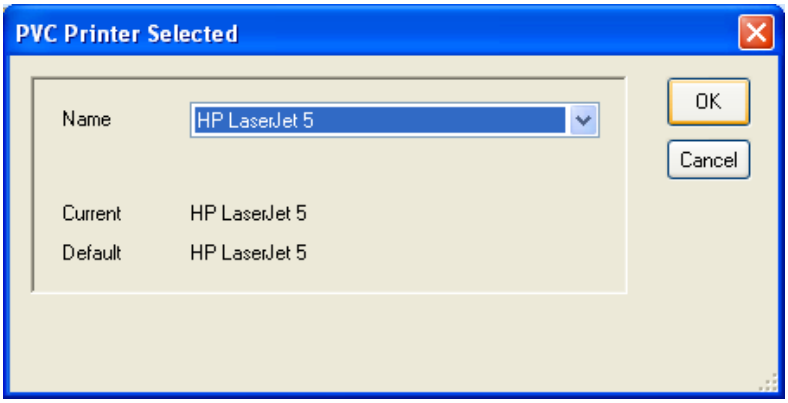
If the main display has been closed then clicking on the notify icon will re-display the main window.
Right clicking on the notify icon produces a menu which allows access to the main display, printer set up, version information or allows application exit.

3.5 Set up: Printer

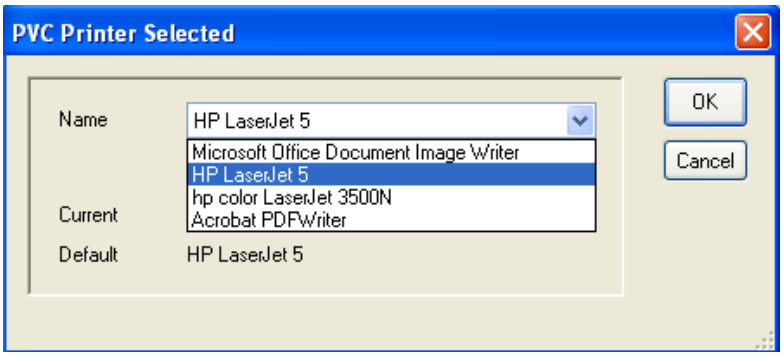
PVC stands for Print Via Computer. This application facilitates the printing of report data, received from an attached instrument, on any printer accessible from the PC. To do this automatically requires that a default printer be set up for the application. *Note that the application will request that this information be entered when starting up if settings denote that this information has not yet been entered*. To change or view the current setting click on the application menu item file, setup, and printer.



This will display the printer setup dialogue.



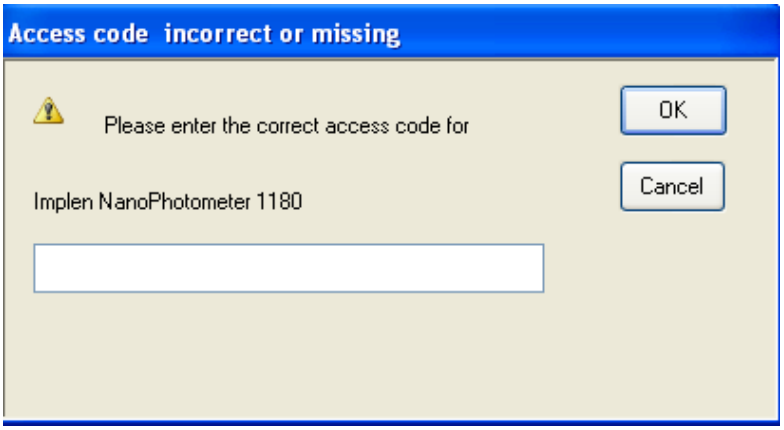
The current printer is that presently being used by PVC, whilst the default is that printer set up as the Windows™ default printer.



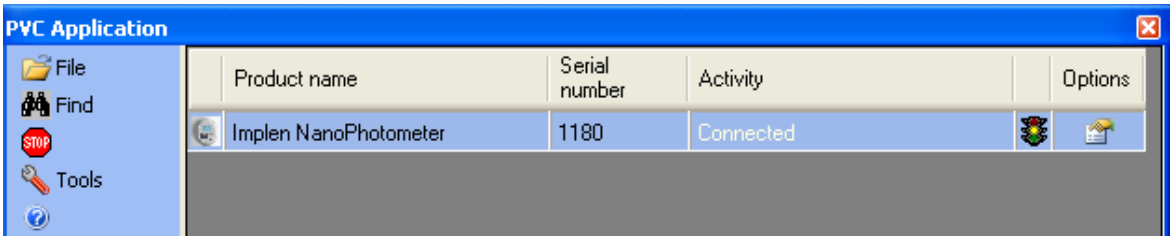
To modify the application setting, click on the drop down list to display all printers set up on the PC. Select the printer you want. Finally click on OK to save the change.

3.6 Instrument configuration

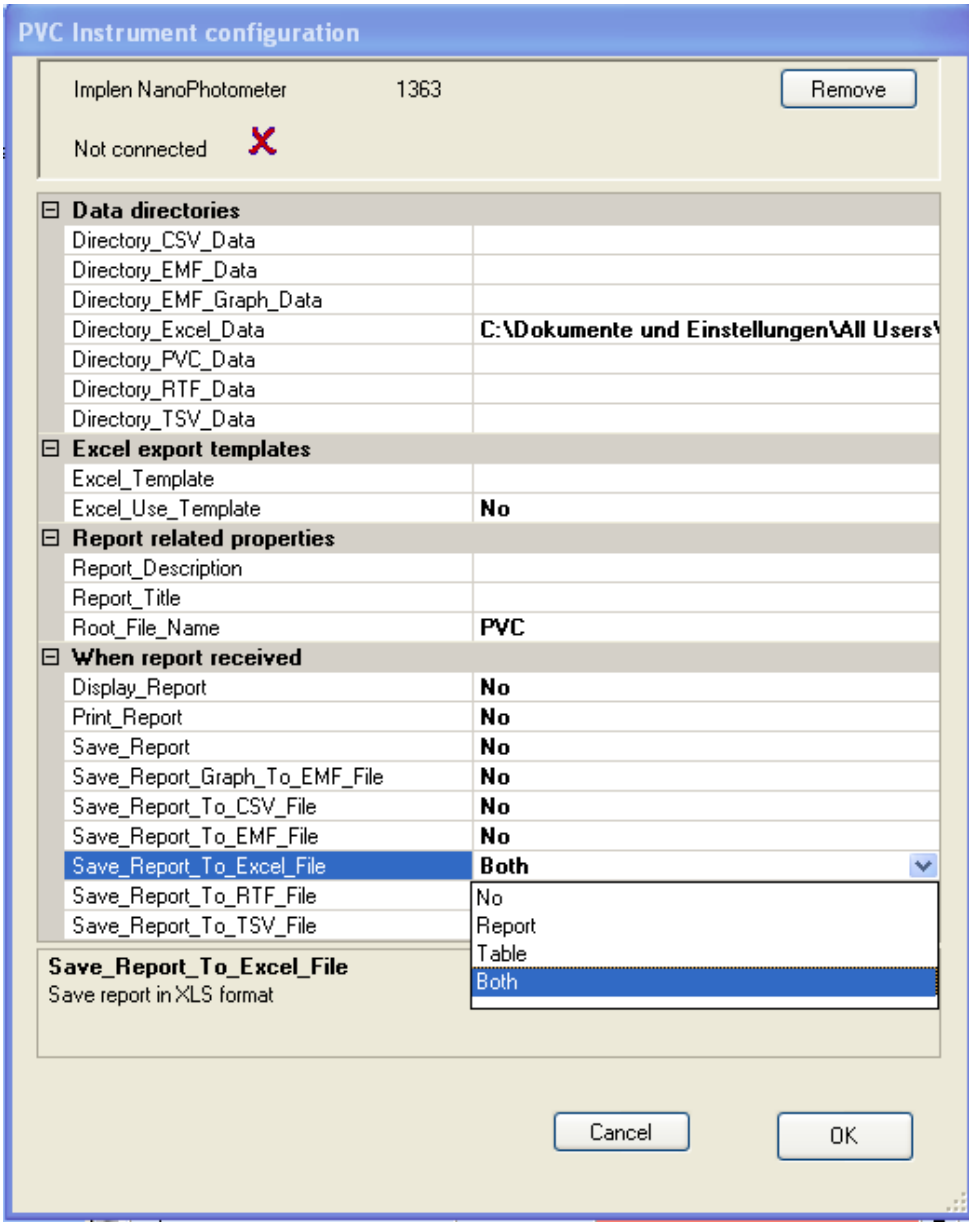
To complete the configuration select "Find instruments" and a pop-up window asks for the access code which is unique for each instrument.



Enter the access code which you will find on your product card (please contact the Implen support team (support@implen.de) if product card is missing).



Once PVC has connected to an instrument, identification and options for the instrument are stored in PVC application settings. To view current settings for an instrument, select the instrument in the list and click on the options icon.



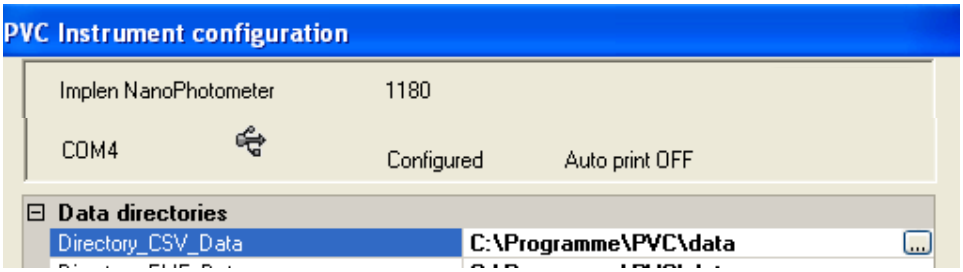
The options dialogue for an instrument has two main parts. The top panel shows connection status information and underneath is displayed the option properties.

3.7 Instrument connection status

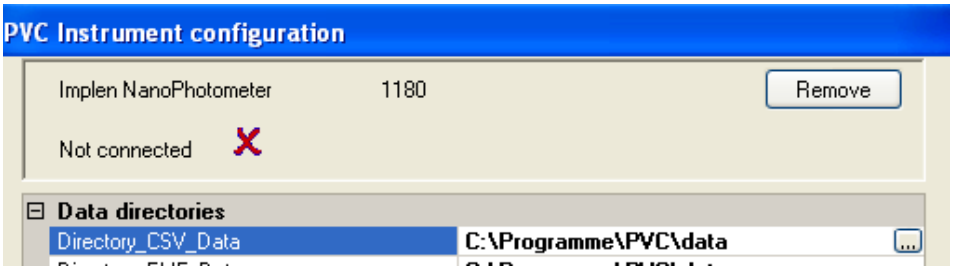
This status panel repeats the instrument product model name and serial number to facilitate identification. It also displays whether connection has been made to the instrument and which COM port is being used to make the connection.

The information includes:

Method used for connection either for USB or for Bluetooth.
Whether this port has been set up as the printer port on the instrument (configured). Note that connection can be made to an instrument using a USB cable but the instrument could be set to use an internal printer. Alternatively a Bluetooth connection could be assumed but the instrument set to use USB.
Whether the instrument was set to auto print when connection was established. An instrument not set to auto print will only produce print report data when the instrument print key is pressed.



Where the instrument is not connected then a cross is shown and a Remove button is displayed.



To remove an instrument, from the list of known instruments that PVC maintains, click on remove. This will remove all knowledge of the instrument from PVC and return you to the main display.

3.8 Instrument options

There are three main property sections, the first defines the folders where different types of data will be stored, the second allows additional information to be added to each report received, and the third selects what action to take when a report is received. *Note that the settings for one instrument are independent to any other instrument settings and so it is possible for a user to maintain division between data from different instruments and customise reports for a particular session.*

3.8.1 Data directories/store data

These default to a data folder, located below the PVC installation location, but each can be set to any folder accessible by the computer. The path can be entered manually in the right hand column, or the edit button at the end of the field can be used to navigate to or create a new data folder. If the option to store the data is disabled the field is shown blank and cannot be changed.

3.8.2 Excel export templates

The Excel export process normally creates Excel data files using the default Excel work book template. The use template flag allows the selection of a user customised template. The selected template field is blank and cannot be changed unless the use field is enabled.

3.8.3 Report related properties

These fields can be edited directly by typing in the property value area.

Report description: This allows a descriptive text containing up to 255 characters to be added to the top of each received data report. By default this is left blank.
Report title: This adds a title to the top of each received data report. By default this is left blank.
Root file name: This adds a user defined prefix to the stored data file name(s). By default this is PVC. For file name composition see Report data filenames.

3.8.4 When report received/save data

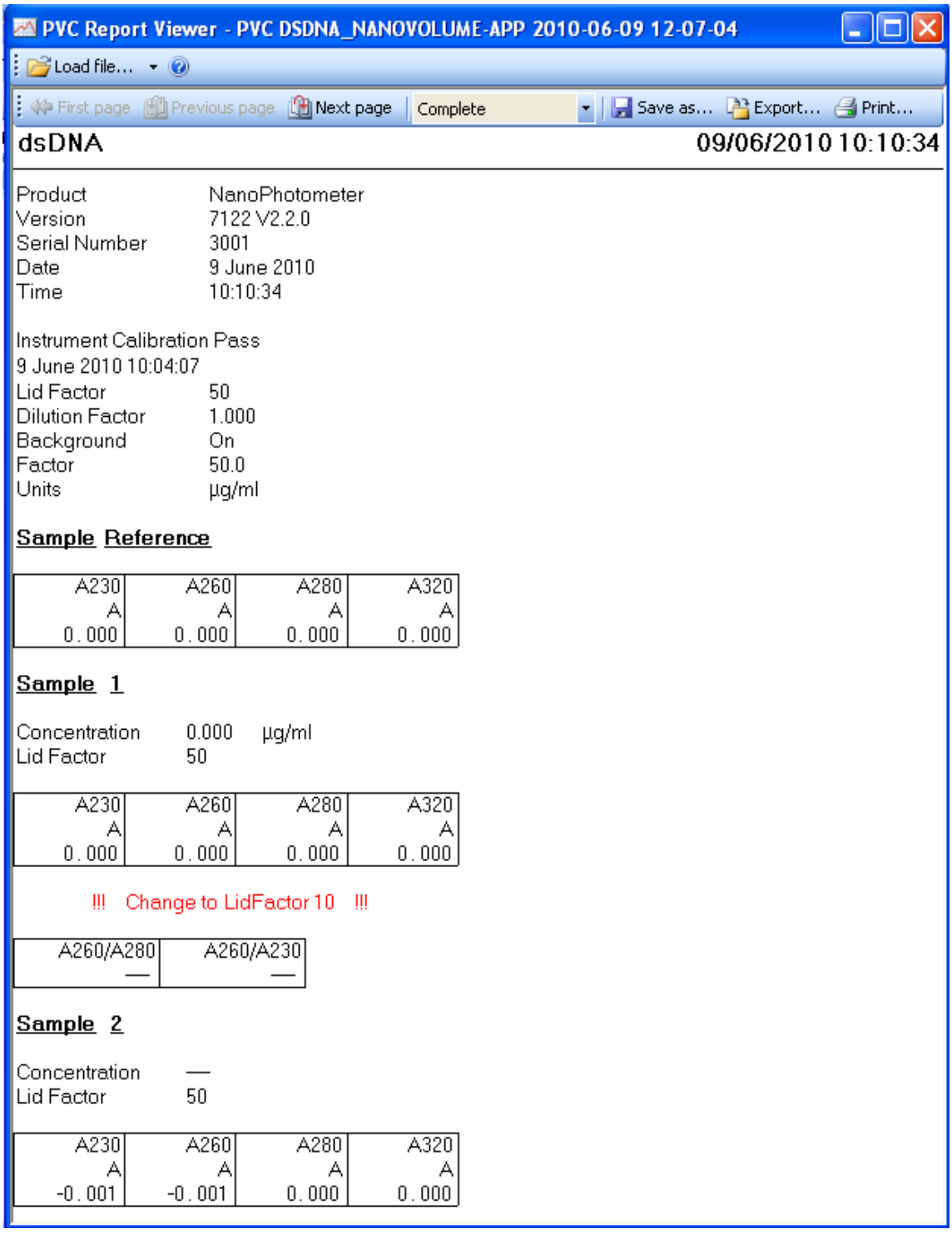
This section defines the actions taken once a complete data report is received from the instrument. To change an item click on an item and use the drop down list or double click on the item to traverse through the set of options.

Display report: This selects whether the report is displayed when the report is received. Two display options are available, either complete or graph only. The report can be printed, exported or saved from the displayed view.
Print report: Sends the report to the PVC application defined default printer.
Save report: Saves the file in a native PVC format. This can be viewed at a later time using the PVC viewer application and then printed or saved from there in a variety of formats.
Save report graph to EMF format: This saves the graph output as an EMF file (EMF: Extended metafile). This is an editable graphics format.
Save report to XXX format: This saves the report in a variety of formats for future use. These are defined below:

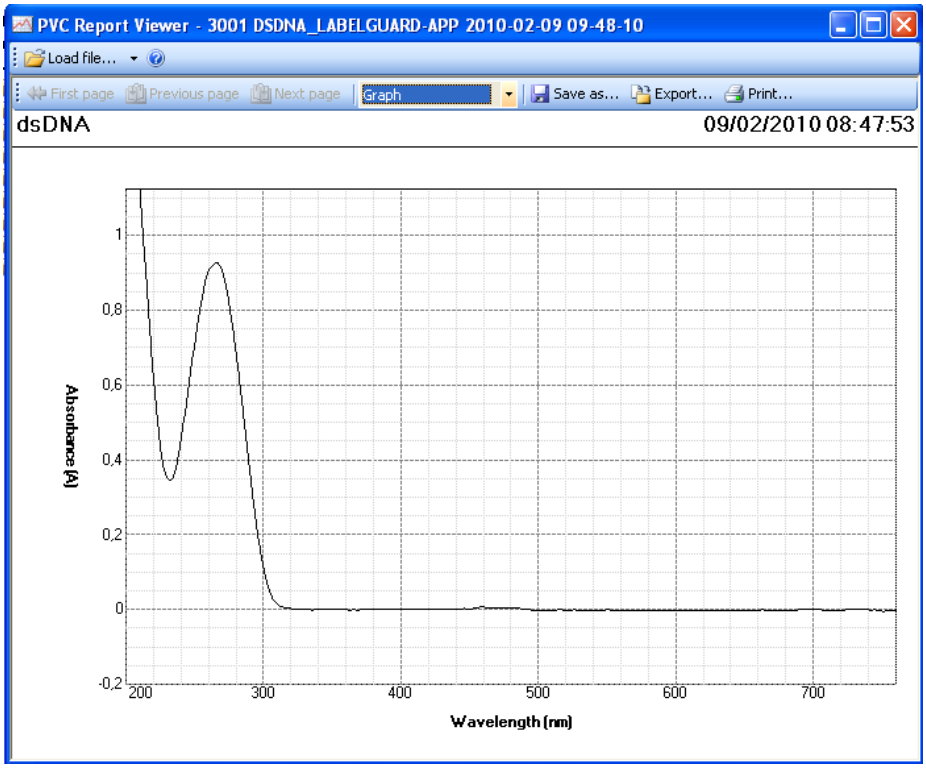
CSV: Comma separated variables; A data format suitable for transfer to a variety of data handling systems.
EMF: Extended metafile. This is an editable graphics format.
XLS: Excel™ spreadsheet format. Data can be saved in a report and/or table file. The file will be created after leaving the method or changing parameter settings. Note that to use this facility the Excel™ application must be present on the PC.
RTF: Rich text format; an editable text format for use in Word™ and other word processor software packages.
TSV: Tab separated variables; A data format suitable for transfer to a variety of data handling systems.

3.8.4.1 Displaying report data

To enable the viewing of incoming reports from an instrument set the instrument option display report to complete or graph only. An example report display is shown below:



The first three buttons (first page, previous page and next page) allow the user to browse through the displayed pages of received data. *Note that page here refers to displayed pages not printed pages, changing the size of the displayed window may change the number of displayed pages*. Alternatively the keyboard page up and page down keys will also be found effective as will the mouse wheel if available.



The complete/graph selection determines whether the full report or just the graphs are shown.

The save as button allows the file to be saved as a native PVC file with a user defined name into a chosen location. *Note that the file name chosen here is completely free format but the file extension is fixed as PVC.*

The export button allows the user to save the report in any of the formats already discussed in instrument options. *Note that the export file name chosen here is completely free format but the file extension is fixed. Note that Excel export is only possible on a PC on which the Excel™ application has been installed.*

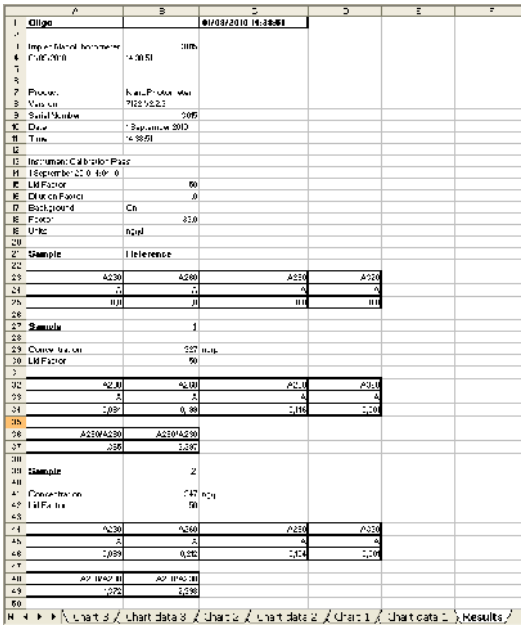
The print button prints the report to a printer selectable from the list of printers known to the PC.

3.8.4.2 Displaying Excel report and/or table data

Excel table file (File name e.g. PVC OLIGO_NANOVOLUME-APP 2010-09-01 14-09-08X.xls):

	A	B	C	D	E	F	G	H	I	J
1		Oligo								
2										
3	Produc:	NanoPhotometer								
4	Version	7122 V2.2.3								
5	Serial Number	3015								
6	Date	01 Sep 10								
7	Time	14:08:31								
8	Instrument Calibration Pass									
9										
10	01.09.2010 14:04									
11										
12	Lic Factor	50								
13	Diuton Factor	1								
14	Background	On								
15	Factor	33								
16	Units	ng/µl								
17										
18	Sample	Lic Factor	A230	A260	A280	A320	A260/A280	A260/A230	Concentration	Units
19	Reference	50	0.030 A	0.300 A	0.000 A	0.000 A			0	ng/µl
20	1	50	0.092 A	0.210 A	0.153 A	0.002 A	1,37	2,305	342	ng/µl
21	2	50	0.089 A	0.208 A	0.150 A	0.001 A	1,39	2,361	342	ng/µl
22	3	50	0.086 A	0.208 A	0.151 A	0.001 A	1,38	2,45	342	ng/µl
23	4	50	0.095 A	0.212 A	0.154 A	0.002 A	1,375	2,25	346	ng/µl
24										

Excel report file (File name e.g. PVC OLIGO_NANOVOLUME-APP 2010-09-01 14-09-08.xls):



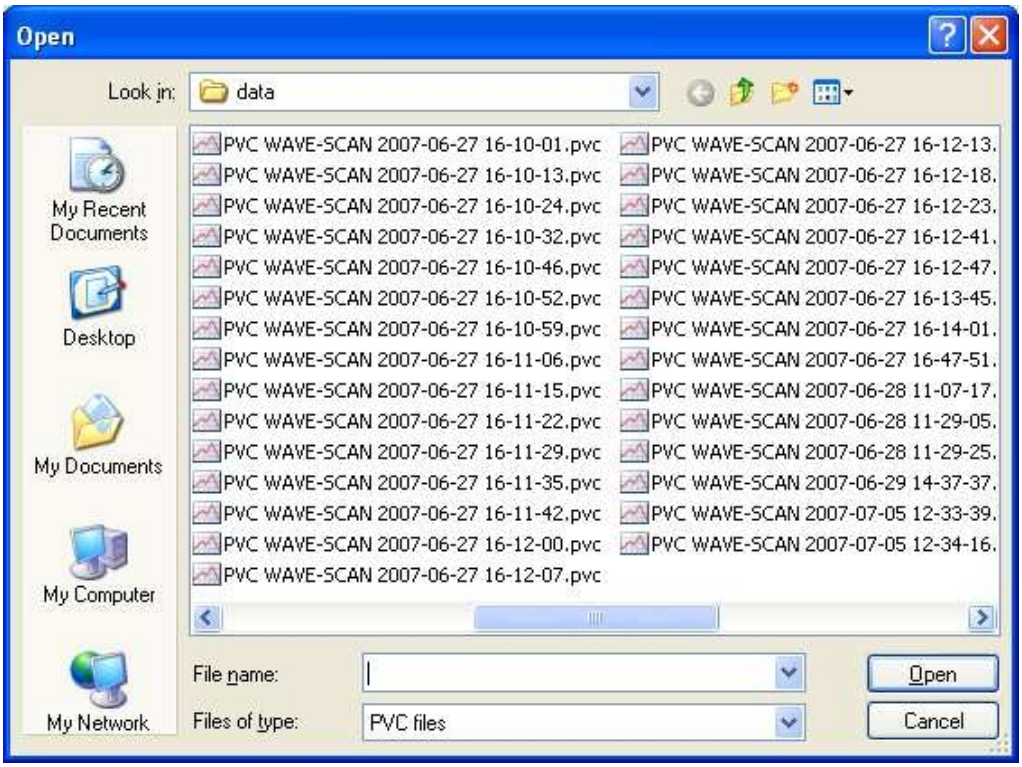
4. PVC VIEWER

This is a separate application that is able to load PVC format files and display them. Once displayed the report data can be printed, saved or exported.

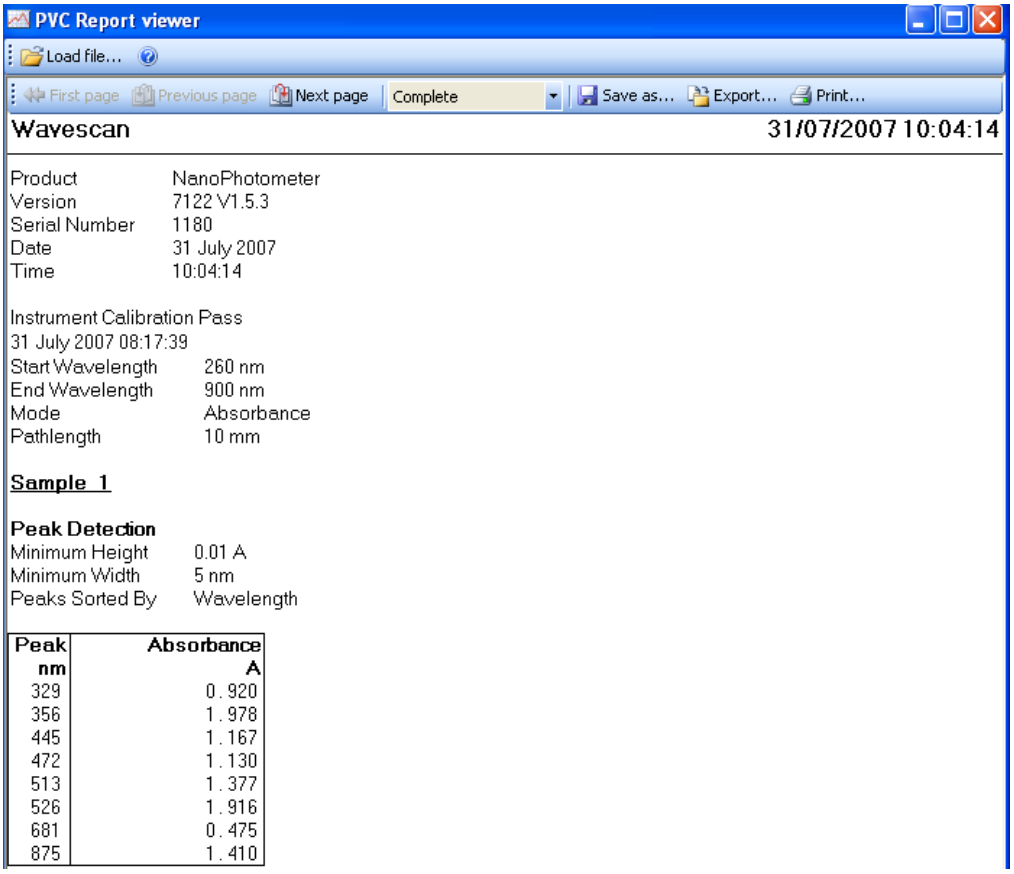
To start up the PVC viewer application

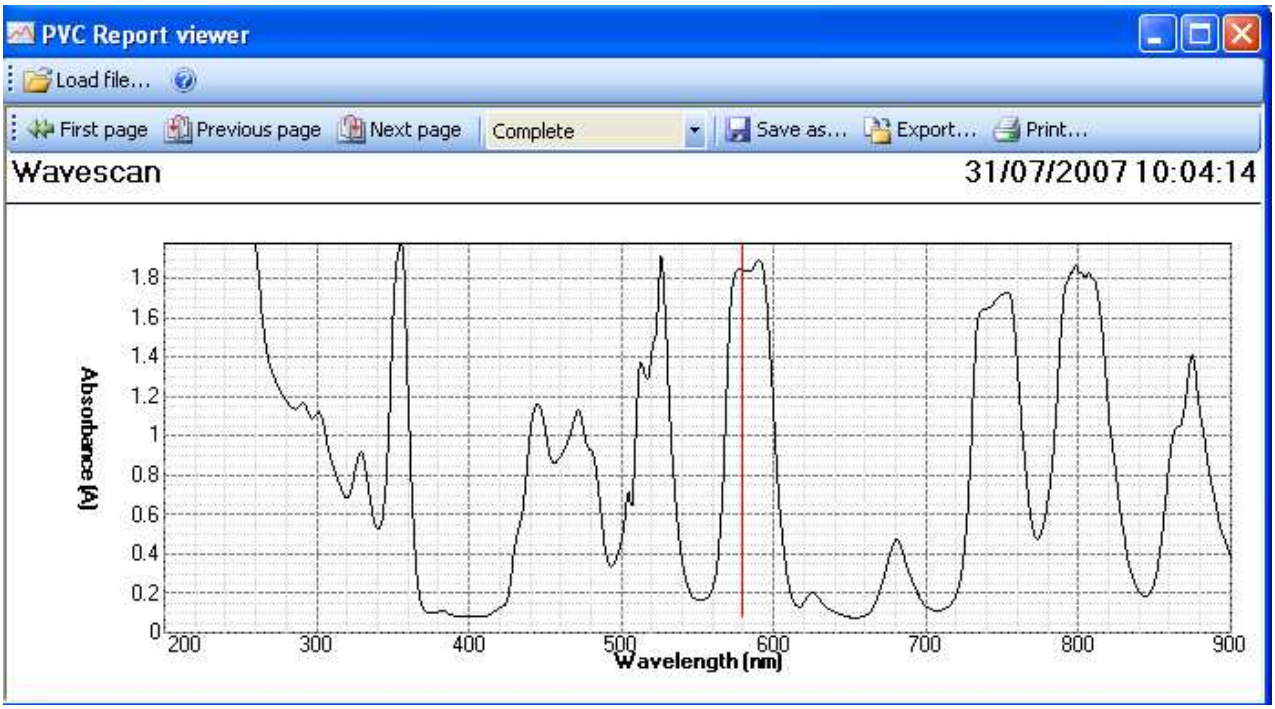
Double click the PVC viewer desktop icon.
Select the PVC viewer item in the start, all programs, PVC menu.
Using windows explorer, explore the program files/PVC folder and double click on PVC viewer.EXE.

To view an existing report data file click on load file. This will display an explorer window allowing selection of a PVC format data file.



Select the file of interest and click on open. This will return to the viewer application with the report displayed.





Note that you can view an existing PVC data file directly by using the windows explorer and double clicking on the PVC data file (extension PVC). This should start up the viewer application and automatically load and display the report.

The displayed format (graph and complete) and facilities to save, print and export are identical to that explained in section Displaying report data.

5. USING PVC

Note

To prevent loss of result data it is important to ensure that instrument settings are correct and that instrument connection has been established before any tests are undertaken.

5.1 Instrument checks

- Ensure the instrument you are using is set up for use with PVC.
- Power up the instrument before PVC searches for instruments.
- Check that the instrument is configured to talk to PVC. On the instrument go to utilities, printer and select the appropriate connection method, Bluetooth or USB.
- Ensure that the auto print setting is appropriate for your working practice. With auto print ON a report will be generated by the running application automatically. With auto print OFF the operator must invoke data printing by clicking on the appropriate option key. Auto print can be switched on or off as a default system setting within the utilities, printer screen, but note the auto print setting can be overridden in individual application methods.

5.2 USB connection checks

To use USB connections check the following:

- To use the USB connection method you must have previously installed the FTDI USB to serial port drivers on the PC.
- Check that the USB cable is plugged in at both ends and the instrument powered. The serial port associated with the USB connection will not be apparent to PVC until you have plugged in the cable. If you unplug the cable the associated serial port will disappear from the port list.
- Power and start up the instrument. An instrument connected to a power supply will be able to establish a USB connection on the PC, but without starting up the instrument, PVC will find the port unresponsive.
- Check the instrument is configured for USB printer output. Note that connection to the instrument does not guarantee that printer data will be output.
- Changing USB ports will change the associated serial port used by the connection. Ensure that this port has not been excluded from the instrument search (see *Improving Instrument search speed*).

5.3 Bluetooth connection checks

To use Bluetooth connections check the following:

- To use the Bluetooth connection method you must already have or have previously installed a Bluetooth radio device on your PC.
- If the Bluetooth connection is achieved using a USB dongle ensure it is fitted and enabled.
- The port associated with a Bluetooth connection will be visible to PVC as soon as the dongle is inserted and enabled. This does not necessarily mean that an instrument exists on the end of the connection.
- Ensure that instruments which you intend to connect using this method are fitted with a Bluetooth module.
- Power and start up the instrument. An instrument connected to a power supply will be able to establish a Bluetooth connection on the PC, but without starting up the instrument PVC will find the port unresponsive.
- Check the instrument is configured for Bluetooth printer output. Note that connection to the instrument does not guarantee that printer data will be output.
- Ensure that the port used for the connection has not been excluded from the instrument search (see *Improving Instrument search speed*).
- Ensure the instrument is in range of the PC Bluetooth radio. The range is usually 10 metres or 100 metres but is influenced by physical structures.
- A dropped Bluetooth connection may not re-establish itself automatically. If you suspect that a connection has been interrupted it would be prudent to get PVC to conduct a new instrument search.

5.4 *PVC checks*

Use these checks to ensure the instrument has connected and is configured.

- Check that the instrument, it is intended to work with, is in the list of known instruments. If it is not shown perform the USB or Bluetooth connection checks as appropriate and click Find to search again.
- Check the instrument is shown as connected. If it is not shown as connected perform the USB or Bluetooth connection checks as appropriate and Click Find to search again.
- Check the options, for the connected instrument, are set up appropriately for you working practice. The report will only be displayed if enabled to do so. Saving in PVC format will only occur if the save action is enabled. Printing will only occur if the action to print is enabled and a default printer has been set up. Export in a particular format will only occur if the appropriate setting has been enabled. Excel export will only happen if Excel is present on the PC and the action has been enabled.
- In the options dialogue, check the connection status panel for diagnostic information (if available). This can diagnose possible causes why data is not being received such as inappropriate instrument settings.
- Check that the port used for connection is not in the port exclusion list (see *Improving Instrument search speed*).

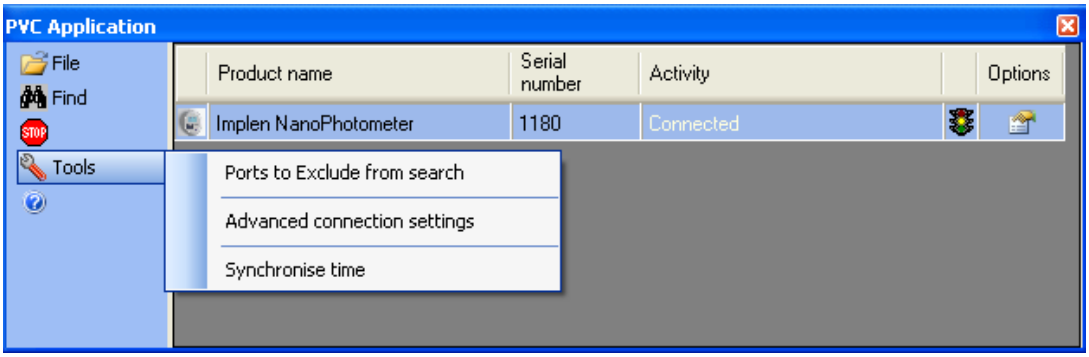
5.5 *Improving Instrument search speed*

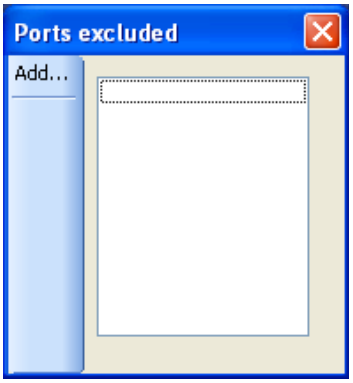
PVC searches USB and Bluetooth ports for attached instruments. This is done under the following conditions:

Start up of the PVC application.
Invoking the find facility.
After updating the port exclusion list.
After synchronising date and time.

In order to establish whether an instrument is present, PVC requests information from the instrument and waits for a response. The duration of the instrument discovery process is depending on the kind of connection (USB or Bluetooth) and the amount of ports searched. To improve search speed PVC allows the creation of a port exclusion list.

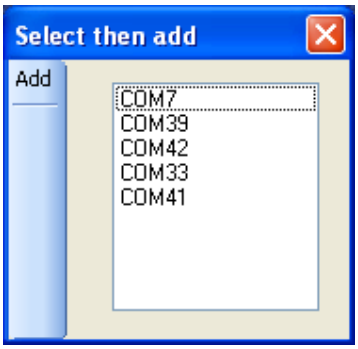
To access the port exclusion list select ports to exclude from search on the tools menu.





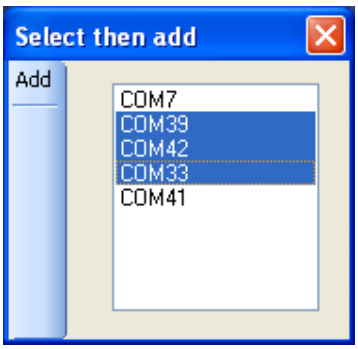
This shows the current exclusion list (in this example empty).

To add ports to the exclusion list click on add.



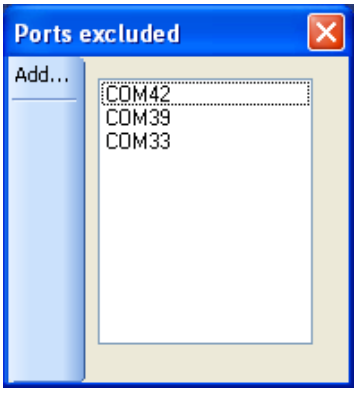
A new dialogue is shown that contains all the ports that will be used in the instrument search. Select ports to exclude by using the mouse.

Note only ports seen by the PC that are Bluetooth or USB will be displayed in this list.



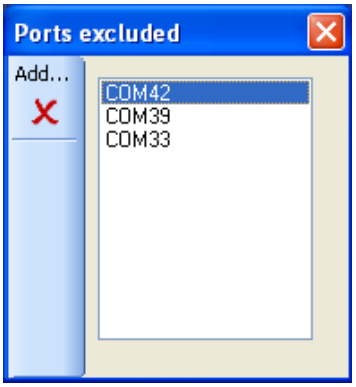
Note that multiple selection is possible using the CTRL or SHIFT key in combination with the mouse selection click.

Once happy with the highlighted selection click Add to add the selected ports to the exclusion list and return to the exclusion list dialogue.



Finally click on to return to the main display and automatically start a new instrument search.

Alternatively to add more ports to the list click on add again.



To remove ports in the exclusion list, highlight the ports first and then click on the symbol. Once satisfied with the displayed exclusion list, return to the main display by clicking on .

Notes

A port in the exclusion list will not be searched and no connection will be made using it.

An instrument attached to a port that is in the exclusion list will not be seen by PVC.

A connection currently in force with an instrument that has its port added to the exclusion list will have its connection dropped.

5.6 Receiving instrument print report data

Instrument print data is only sent to PVC when:

Auto print has been enabled on the instrument and a test has been performed.
A test has been performed and the instrument print (accessed from the options key) is invoked.
The method is closed or parameter settings are changed.

PVC works with *complete* print data reports and not with individual tests. Once a complete print report has been received it is able to carry out the actions configured in the instrument options of displaying, saving and exporting the complete report.

Notes
If auto print is disabled and the print key is being used, then only the last test performed will be added to the print report.
Different instrument applications work in different ways with respect to what constitutes a complete report. In general an application that creates many result values during a single run or involves a complex multistage method will probably produce a complete report per run of the method. By contrast an application method that once set up provides a simple test result per run will probably only add each run result to a single method report result table.

For example:

When a wave scan is carried out, a new print report is generated with each run. For single wavelength application settings information forms the first part of the report followed by a result table. Each run produces one new result that is appended to this table, but the report is not deemed complete until all test results have been taken. This is implied by the user leaving the application. Thus for single wavelength only when the user exits the application does the application know that all results have been taken and the printed report is completed. This approach makes subsequent data manipulation easier for the user, as all results are in a single table. It also uses less paper. A side effect of this approach means that it may not be until all measurements have been taken that it is discovered that the connection to the PC was not correctly made or the instrument set up properly. For this reason it is recommended that before starting a measurement session that the connection to PVC is first proven. (This can be done using an application such as wave scan to verify that connections and option settings are correctly set up.)

If the instrument has been correctly set up to print and all connection and PVC checks have been performed and a report has still not been displayed, printed or exported then it may simply be because the instrument application being used needs to be exited first. On the instrument use the application exit, escape or back key.

5.7 Associating received data with methods and people

5.7.1 Introduction

Each instrument known to PVC has its own set of options accessible via the options symbol. This means we can customise filenames, data locations and add information to reports on an individual basis. Stored report data is also associated with a date and time associated with the report generation timestamps.

5.7.2 Report data filenames

The filenames used for storage and export of report data are composed using the following elements:

<Root Prefix> <Application name> <Date> <Time>.<File extension>

Where

<Root Prefix>	is defined on the options page for the instrument.
<Application name>	is the instrument application name supplied by the instrument in the report data, for example WAVE-SCAN.
<Date>	is the PC date when the report is completed. The date element is arranged in the order YEAR-MONTH-DAY and thus allows the windows explorer to sort in ascending or descending date order.
<Time>	is the PC time when the report is completed. The time element is arranged in the order HOUR-MINUTE-SECOND and thus allows the windows explorer to soft files in ascending or descending time order.
<File extension>	reflects the format of the data stored.
Example	PVC WAVE-SCAN 2007-06-01 11-20-10.pvc

5.7.3 Report timestamps

All reports have timestamps associated with them. Timestamps enable the tie up of reports with particular method sessions.

5.7.4 Filename date and time

The PC date and time is used as a timestamp element in the formation of all filenames used to save or export report data to. The timestamp is of the report completion event being detected.

5.7.5 Report data timestamp

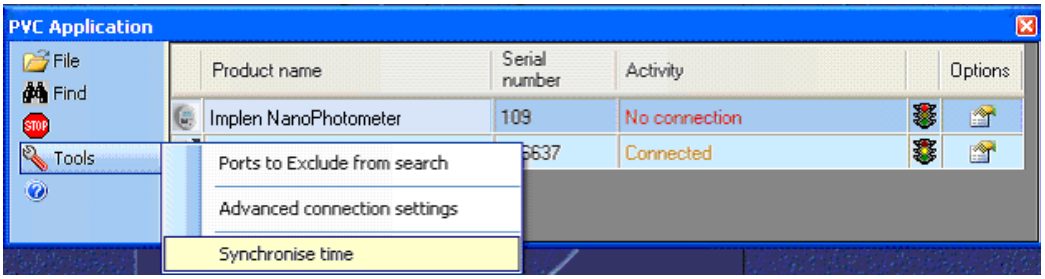
When the start of the report is received by PVC, the PC date and time is used to fill in a report started timestamp (This is distinct from the completion timestamp used in filenames). The instrument application normally provides its own report start timestamp and where this information is received it is used to override the setting created by PVC. A timestamp derived from the instrument will reflect the instrument date and time setting. *Note that by default the report data timestamp is shown in the right header position on displayed, printed and exported reports but can be overridden by report header settings defined by the application*. An instrument application defines the layout of its own printed report but will normally include the report timestamp within the application report summary details preceding the result tables.

5.7.6 Test result timestamp

For applications in which each run generates a new test result that is stored in the same report, then each result is time stamped. The format of this timestamp is under instrument application control but will reflect the date and time on the instrument.

5.7.7 Synchronising PC and instrument time

If the instrument date and time and PC date and time, diverge then confusion can arise because the internal report date and time could be markedly different to the filename timestamp. For this reason it is often convenient to synchronise the instrument date and time with the PC setting. This can be easily done in PVC by clicking on the Tools Synchronise time menu.



This will temporarily stop the collation of report data (and so is best done before starting a PVC session) and updates all connected instruments with the PC date and time. It will then automatically conduct a new search for instruments and restart the report data collection mode.

5.7.8 Source instrument

The report data always contains source instrument identification including product name and product serial name, but this would require opening and viewing the data. To facilitate easy identification of data files associated with a particular instrument in the same directory, PVC provides the following features on the instrument options page:

All the data directories can be set to have a common directory root that identifies the instrument.
The filename prefix can be changed to identify a particular instrument.

5.7.9 User

If it is required to identify the person using an instrument or carrying out a method then this can be done within the report or the identification can form a part of the filename or location.

To associate a data file with a person, for this session, go to the options page for the instrument and change one or more of the following:

The data directory root can be changed to identify a person.
The filename prefix can be changed to be the person's name.

For example a classroom with instruments assigned to different students could be set up with prefixes denoting the students names, enabling a lecturer to distinguish student results.

To add user identification into the report itself, go to the options page for the instrument and add one or more of the following:

Report title
Report description

5.7.10 Application method name

The report data always contains source application identification. The application name is normally reflected in any report filename created see Report data filenames.

If required this information can be augmented by

Changing the filename prefix
Adding a report title for the session
Adding a report description for the session

5.7.11 Adding test information

It is sometimes useful to add test information to a report that helps describe the purpose of the test or test conditions. This can be done directly to the report by

Adding a report title for the session
Adding a report description for the session

Alternatively the report can be exported and the information augmented in your own report generator programmer.

5.8 Exporting

PVC is capable of exporting the print report data in a variety of different file formats. In most cases the generated report contains a single result page which contains a header all report information and a footer, but note that some instrument applications might specify more than one result page. Here each page would have its own header and footer.

Note that some report export formats may be inappropriate. For instance an EMF graph only format would not be very useful where the application report did not generate any graph result. In such cases a diagnostic message is included in the report to indicate that there is no data to show.

5.8.1 Unicode

PVC uses Unicode characters. This allows PVC to generate report data that uses a mixture of Western European characters and characters found in other languages. This is necessary because some instrument settings can create application reports that contain a mixture of Western and other characters (for instance setting Japanese language on an instrument).

Please be aware that some old applications (or old versions of applications) may not be Unicode aware and might attempt to map the Unicode characters to ANSI when loading a file. This is usually not a problem with files containing only Western European characters but can lead to incorrect mapping of characters or the insertion of extra characters. *Please note that we cannot support third party software*.

5.8.2 Installed fonts

When Windows is installed on a PC then the fonts installed by default are chosen based on the international locale specified. This means that a PC set up to use the Western European character set by default is unlikely to have Japanese character sets loaded. Under such circumstances applications may not be able to map certain Unicode character values to character representations (and questions marks may be shown). Note that this is unlikely to be seen because if you need to work with a language like the simplified Japanese supported by some instruments then you will probably have already installed the appropriate fonts on your PC.

5.8.3 Excel TM export

Excel can be configured to try and auto format some fields in accordance with locale conditions. This can lead to issues when dates and times and numbers are imported into cells, which do not apparently conform. Some of the information supplied by an instrument as part of the report data can contain such information and the format of such text embedded in a report is under the control of instrument programming and instrument user settings. For this reason it is sometimes necessary to import into cells using a text format rather than a date or numeric format.

5.8.4 Excel direct export

PVC uses the Microsoft Office Interoperability interface in order to transfer print data into Excel file format. The interface supplied is compatible with Excel version 97 to 2003. This overcomes many of the problems experienced in trying to import file data into Excel that can result when the data contains different numeric decimal point representation or use of special characters. To use this facility requires that the Excel application be accessible from the PVC application. Direct Excel export is not possible unless Excel is found. The direct export allows PVC to create result worksheets that maintain the majority of the original report colour and font attributes. It also creates separate result sheets and chart sheets that plot the result data automatically. Note that the data is created as a read only file. This is done on purpose so that a customer cannot mistakenly alter the contents.

5.8.5 Excel export using CSV file

PVC CSV export does not require Excel to be present on the PC. These files are text only, but they do contain the tabulated graph data. Excel is able to recognise .CSV files and can load these files automatically. The customer can select the graph data and then create their own charts. Please note that the automatic Excel import may assume the use of ANSI characters and confuse some characters during loading. It may also attempt to split up numbers where instrument settings use comma instead of point for the decimal point representation resulting in numbers split over two cells.

5.8.6 Excel export using TSV file

This is a similar approach to the CSV file format but here we use tab as a separator. Here we can invoke the excel import wizard and better control the import process. This approach overcomes the problems associated with the use of comma for the decimal point representation in numbers.